

WHAT IS CLAIMED IS:

1. A semiconductor laser driving apparatus for driving a semiconductor laser for directing light to an optical disc for recording a recording mark on the optical disc based on a recording current and reproducing the recording mark recorded on the optical disc so as to generate a reproduction signal, the semiconductor laser driving apparatus comprising:

a reproduction current generation section for generating the reproduction current;

a high frequency current generation section for generating a high frequency current including a high frequency component for reducing semiconductor laser noise included in the reproduction;

a recording current generation section for generating the recording current, the recording current including a pulse corresponding to the recording mark and the pulse including a plurality of multi-pulses; and

a current driving section for amplifying the reproduction current and the recording current,

wherein the high frequency component included in the high frequency current generated by the high frequency current generation section is enhanced at the time of reproduction, and the high frequency component included in the recording current generated by the recording current generation section is enhanced at the time of recording,

the semiconductor laser driving apparatus further comprising:

a filter for operating so as to attenuate the enhanced high frequency component included in the high frequency current generated by the high frequency current

generation section and the enhanced high frequency component included in the recording current generated by the recording current generation section; and

a switching section for switching the filter on or off so that the enhanced high frequency component included in the recording current is superposed on at least one of the plurality of multi-pulses included in the pulse of the recording current.

2. A semiconductor laser driving apparatus according to claim 1, wherein the current driving section has a frequency characteristic for enhancing the high frequency component, and the current driving section enhances the high frequency component included in the high frequency current generated by the high frequency current generation section at the time of reproduction and enhances the high frequency component included in the recording current generated by the recording current generation section at the time of recording.

3. A semiconductor laser driving apparatus according to claim 1, wherein the switching section includes a switch connected to the filter and a timing control section for controlling the timing of opening or closing of the switch.

4. A semiconductor laser driving apparatus according to claim 1, wherein the at least one of the plurality of multi-pulses includes a leading multi-pulse.

5. A semiconductor laser driving apparatus according to claim 1, wherein the pulse includes a specific pulse having a specific pattern, and the switching section causes the filter to operate so that the enhanced high frequency component included in the recording current is superposed

on the specific pulse.

6. A semiconductor laser driving apparatus according to claim 5, wherein:

the recording mark includes a 3T mark recorded by 8-16 modulation,

the specific pulse includes a 3T pulse corresponding to the 3T mark, and

the switching section causes the filter to operate so that the enhanced high frequency component included in the recording current is superposed on the 3T pulse.

7. A semiconductor laser driving apparatus according to claim 1, wherein the switching section causes the filter to operate so that the enhanced high frequency component included in the recording current is superposed on a portion of at least one of the plurality of multi-pulses included in the pulse.

8. A semiconductor laser driving apparatus according to claim 1, wherein the switching section causes the filter to operate so that the enhanced high frequency component included in the recording current is superposed on an entirety of at least one of the plurality of multi-pulses included in the pulse.

9. A semiconductor laser driving apparatus according to claim 1, wherein the at least one of the plurality of multi-pulses includes a trailing multi-pulse.

10. A semiconductor laser driving apparatus according to claim 1, wherein the switching section causes the filter to operate so that the enhanced high frequency component

included in the recording current is superposed on all of the plurality of multi-pulses included in the pulse.

11. A semiconductor laser driving apparatus according to claim 1, wherein the reproduction current is a DC current.

12. A semiconductor laser driving apparatus according to claim 1, wherein the switching section causes the filter to operate so that the enhanced high frequency component included in the high frequency current is superposed on the reproduction current at the time of reproduction, and causes the filter to operate so that the enhanced high frequency component included in the recording current is attenuated at the time of recording.

13. A semiconductor laser driving apparatus according to claim 1, wherein the high frequency component has a frequency of 100 MHz or higher.

14. A semiconductor laser driving apparatus according to claim 13, wherein the high frequency component has a frequency of 100 MHz or higher and 450 MHz or lower.

15. A semiconductor laser driving apparatus according to claim 1, wherein the high frequency component has a frequency of substantially 300 MHz.

16. A semiconductor laser driving apparatus according to claim 1, wherein the filter includes a high pass filter.

17. A semiconductor laser driving apparatus according to claim 1, wherein the high frequency component has a frequency which is higher than a cut-off frequency of the

filter.

18. A semiconductor laser driving apparatus according to claim 1, wherein the filter includes a plurality of filter circuits having different frequency characteristics and different impedance values from one another.

19. A semiconductor laser driving apparatus according to claim 18, wherein the switching section selects one of the plurality of filter circuits as a filter circuit which operates based on a linear velocity of the optical disc.

20. An optical disc apparatus, comprising:

an optical pickup for recording a recording mark on an optical disc and reproducing the recording mark recorded on the optical disc;

a motor for rotating the optical disc; and
a control block for controlling the optical pickup
and the motor.

wherein:

the optical pickup includes:

a semiconductor laser for directing light to the optical disc for recording the recording mark on the optical disc based on a recording current and reproducing the recording mark recorded on the optical disc so as to generate a reproduction signal, and

a semiconductor laser driving apparatus for driving the semiconductor laser, the semiconductor laser driving apparatus including:

a reproduction current generation section for generating the reproduction current,

a high frequency current generation section for generating a high frequency current including a high

frequency component for reducing a semiconductor laser noise included in the reproduction signal,

a recording current generation section for generating the recording current, the recording current including a pulse corresponding to the recording mark and the pulse including a plurality of multi-pulses, and

a current driving section for amplifying the reproduction current and the recording current,

wherein the high frequency component included in the high frequency current generated by the high frequency current generation section is enhanced at the time of reproduction, and the high frequency component included in the recording current generated by the recording current generation section is enhanced at the time of recording,

the semiconductor laser driving apparatus further comprising:

a filter for operating so as to attenuate the high frequency component included in the high frequency current generated by the enhanced high frequency current generation section and the enhanced high frequency component included in the recording current generated by the recording current generation section, and

a switching section for switching the filter on or off so that the enhanced high frequency component included in the recording current is superposed on at least one of the plurality of multi-pulses included in the pulse of the recording current.

21. An optical disc apparatus according to claim 20, wherein the current driving section has a frequency characteristic for enhancing the high frequency component, and the current driving section enhances the high frequency component included in the high frequency current generated by the high

frequency current generation section at the time of reproduction and enhances the high frequency component included in the recording current generated by the recording current generation section at the time of recording.

22. An optical disc apparatus according to claim 20, wherein:

the control block includes a linear velocity detection section for detecting a linear velocity of the optical disc, and

the switching section causes the filter to operate so that the enhanced high frequency component included in the recording current is superposed on at least one of the plurality of multi-pulses included in the pulse based on the linear velocity of the optical disc.

23. An optical disc apparatus according to claim 22, wherein the linear velocity detection section detects the linear velocity of the optical disc based on the reproduction signal.

24. An optical disc apparatus according to claim 22, wherein the linear velocity detection section detects the linear velocity of the optical disc based on a rotation speed of the motor.

25. An optical disc apparatus according to claim 22, wherein the linear velocity detection section detects the linear velocity of the optical disc based on a radial position of the optical pickup on the optical disc.